CRYOSURGICAL FLUID SUPPLY

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] The present application is a continuation patent application of U.S. U.S. Patent Application No. 10/105,577 filed March 21, 2002, now U.S. Patent No. 6,786,901, which is a continuation of U.S. Patent Application Serial No. 09/268,205 filed March 15, 1999, now U.S. Patent No. 6,432,102, the full disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates generally to apparatus and methods for cryosurgical therapy. In a particular embodiment, the invention provides a cryosurgical fluid delivery system which makes use of transients in the cooling cycle to moderate the cooling effects of a cryosurgical endovascular balloon catheter.

[0003] A number of percutaneous intravascular procedures have been developed for treating atherosclerotic disease in a patient's vasculature. The most successful of these treatments is percutaneous transluminal angioplasty (PTA). PTA employs a catheter having an expansible distal end (usually in the form of an inflatable balloon) to dilate a stenotic region in the vasculature to restore adequate blood flow beyond the stenosis. Other procedures for opening stenotic regions include directional atherectomy, rotational atherectomy, laser angioplasty, stenting, and the like. While these procedures have gained wide acceptance (either alone or in combination, particularly PTA in combination with stenting), they continue to suffer from significant disadvantages. A particularly common disadvantage with PTA and other known procedures for opening stenotic regions is the subsequent occurrence of restenosis.

[0004] Restenosis refers to the re-narrowing of an artery following an initially successful angioplasty or other primary treatment. Restenosis typically occurs within weeks or months of the primary procedure, and may affect up to 50% of all angioplasty patients to some extent. Restenosis results at least in part from smooth muscle cell proliferation in response to the injury caused by the primary treatment. This cell